TRANSLATION NO. 47

DATE: July 1968

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

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Journal of Microbiology, Epidemiology and Immunobiology No. 1-2, 1944, Pages 43-46

On the Results of Work by the Epidemiological Division of the FEIEM on the Study of Tick Spotted Fever in the Khabarovsk, by V. I. Shkorbatov

Only in 1940 did an attentive study of tick spotted fever begin in far east Russia, along with studies in Central Russia.

By calculation of the work performed and results obtained by the above work we regard this disease requires further study.

We reviewed past material on the subject to aid us in our work; Savitskaya's method of isolating virus (1940) by infection of 4-5 cm^3 of blood, taken on the 4-10th day of fever, into avitaminatic guinea pigs. A sowing of the blood on a sugar broth was done during this and the serum of the pigs was analyzed for agglutinins to Proteus OX. An emulsion of 8-10 powdered ticks was used to infect one pig during study of the tick. Infection of the pigs used for passages was done with an emulsion of brain spleen, testicles and suprarenal glands, taken from fevering pigs.

We obtained 4 strains of tick spotted fever, 3 from patients and one from the tick Dermacentor silvarum. Of the three blood strains, one was isolated from a patient with an atypical infection which was first regarded as grippe. These strains were subjected to 7-11 passages and served as material for the study of the transvarisble transmission of the virus in ticks and for the development of a laboratory method of determining the rickettsiosis infectability of ticks without using guinea pigs. Starting with the 2 or 3 passage, we noted a quite constant scrotal phenomenon.

The infecting of guinea pigs indicated the incubation period to be 3-5 days, the fever period 3-4 days. Incubation periods during isolation of the

virus from ticks was 7 days. A one degree increase in temperature was average.

More strains of virus were isolated by us in the institute from eggs of ticks Dermacentor silvarum, and also from pigs, infected directly by ticks, lymphs or larva, obtained from infected ticks. These strains also worked well in passages.

Rabbits, injected with blood and tick strains, intratesticularly, reacted with agglutinins to Proteus OX19 and a weak indication of orchitis in the 1:20^ titer. In the serum of rabbits, on which the ticks were fed, were noted agglutinins to Proteus OX 19 (1:100); on the skin o. rabbits, in the locale of the tick bite, were observed slightly swelled reddish blots, replaced later by pigmented blots of a smaller size.

During feeding of nymphs, larva and imago ticks on rabbits, the skin responded identically as in humans. The area usually swelled, and infiltrate appeared, scabs of a dark brown color appeared; after the falling away of these scabs, a colored round form of scar, with a black center, puncturing the skin, remained. We observed effects on the rabbits, being used as hosts to the larva nymph and imago ticks, identical to those possible in humans. In some clinical cases, swelling of the bite area did not take place, even though infections had set in. Also, the opposite, the bite area swelling and no infection.

The ticks selected by us proved to be of three classes, mainly Dermacentor silvarum and Haemophysalis concinna, the other example was Ixodes persulcatus, from which no virus was isolated and in which no virus regenerated.

Breeding and care of the first two types of ticks in laboratory conditions was very easy.

We tried, by several variations, to determine the rickettsiosis infect-

ability of the tick on rabbits. No positive results were obtained.

Blood of 20 ill and 38 healthy people, but all bitten by ticks, was analyzed. The blood of the ill was taken twice - at the climax of the fever and upon release. Results - 15 of 20 ill patients indicated agglutinins to Proteus OX19, in the titers 1:400 - 1:800 average (Maximum - 1:12,800; minimum - 1:50). Agglutinins to all three OX 19, OX2 and OX:K, simultaneously, were noted in two patients and of these two one held agglutinins to OX19 - 1:800, OX2 and OX:K - 1:50; upon release this same patient held agglutinins to OX:K, but to OX19 and OX2 at a titer of 1:200. The blood of the other patient, upon second analysis, showed no agglutinins to OX:K and OX2, but twofold agglutinins to OX19 (1:200 - 1:400). In one patient there were agglutinins to Proteus OX only, and a second analysis showed none whatsoever. Two patients had no reaction to any of the Proteus listed above.

In 38 serums of healthy people, 50% of whom had the first symptoms, no agglutinins of any of the Proteus were seen.

Of all the cases covered by us, 70.2% were in the spring-summer season; 47.1% had first symptoms. The number of tick bites per person is as follows: one bite - 46.6%; two - 23.1%; three - 18.1%; four - 8.6%; five - 2.7% and six - 0.4% of all those people bitten. A scab formed in only part of the cases while the bite areas swelled from 39% to 100%. Only 3% of those bitten actually became infected, although some had ill effects (headaches, weakened conditions, loss of appetites, etc.).

CONCLUSIONS

1. The isolation of this virus from the blood of patients or from ticks, through injections into the peritoneal of avitamitic guinea pigs, is easy.

2. The transvariable transmission of the virus in ticks Dermacentor silvarum is to the second generation as a rule.

3. By using the rabbits as hosts for the ticks, in various stages of their development, first effects can be obtained identical to those in man with slight exceptions.

4. In blood of patients and reconvalescents, of tick fever, is observed agglutinins to Proteus OX19, OX2 and OX:K with OX19 dominating. Agglutinins to 2 or all of these at once is rare. The average titer to OX19 is 1:400 - 1:800, and 1:20 to OX2 and OX:K.

5. Only 3% of those bitten actually contacted the disease. Others who suffered ill effects constituted 1/3.